PVP 14

Code: CE2T3, CS2T3, IT2T3

I B.Tech - II Semester – Regular Examinations – April 2016

ENGINEERING PHYSICS
(Common for CE, CSE & IT)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11x 2 = 22 M

1. a) What are the conclusions of de- Broglies Hypothesis?
b) What is Heisenberg uncertainity principal?
c) Explain the significance of Miller indices.
d) Define and explain the space lattice.
e) Mention the important failures of Classical free electron Theory.
f) Define Dielectric constant.
g) Explain the concept of Feerimagnetism.
h) Write about Fermi level in intrinsic the Semi conductor.
i) Explain the Population inversion condition.
j) Write the principle of an Optical Fibre.
k) What are nanomaterials.

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Describe the construction and working of Davison and Germer experiment to estimate the dual nature of Material particle. 12 M

b) Calculate the de- Broglies wave length of an electron which has been accelerated from rest on application of potential of 400 volts. 4 M

3. a) Explain a short note on seven types of Crystal systems. 6 M

b) Find the packing fraction of SC, BCC, and FCC crystals. 6 M

c) A beam of X-rays is incident on a Nacl crystal with lattice spacing 0.282 nm. Calculate the wavelength of X- rays if the first order Bragg reflection takes place at a glancing angle of 8^{o} 35′. 4 M

4. a) Derive the expression for the electronic polarisability of a dielectric material 10 M

b) Derive the Classius-Mossotti relation. 4 M

c) The dielectric constant of He gas at NTP is 1.0000684. Calculate the electronic polarisability of He atoms if the gas contains $2.7x10^{25}$ atoms/m^3. 2 M

5. a) Distinguish between intrinsic and extrinsic semiconductor. 6 M

b) Derive a expression for the carrier concentration of an n-type semiconductor. 6 M

c) Discuss Fermi level in p type semiconductors. 4 M

6. a) Discuss the electrical and mechanical properties of nanomaterials. 6 M

b) Explain the synthesis of nanomaterials by Sol-Gel method with a neat flow chart. 6 M

c) Write any two applications of LASERS in defense. 4 M